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that the disturbances of equilibrium which I have above attributed to concussion, are due to some specific functional disturbance in the semicircular canals; but observations drawn from a study of a large number having anomalies of the drum of the ear, lead me to exclude that theory. It is true of the aurally vertiginous just described, that they represent chronic forms of ear-disease, and are usually neuropathic subjects beyond middle life. But similar cerebral disturbances are not unusual at any age in acute inflammation of the middle ear. Other things being equal, elderly persons are less obnoxious to sea-sickness than the young, since the latter are much more susceptible to impressions upon the nervous system. A friend of the writer who has made many ocean-voyages was always a great sufferer in this regard in early life, but in after years experienced but little inconvenience in the roughest weather. On one occasion, however, a berth was assigned him in the after part of a vessel, when, after experiencing for a short time the discomfiting concussions arising from the motions of the screw, he became dreadfully sea-sick while lying in bed. The distress becoming unbearable, he was removed to a berth amidships, when recovery was almost immediate. It is well known that persons at the beginning of a voyage may become quite sea-sick, and yet entirely recover before landing, — an experience probably due to the bracing effect of sea-air. It will be seen, that, regarded from the point of view afforded by an aurist's clinical experience, nearly all of the phenomena of sea-sickness may be said to occur on shore, in consequence of cerebral (labyrinthine) concussion, especially during a state of nervous exhaustion. Sea-sickness would seem to be brought about in most instances, irrespective of aural defects, from the agitation of the cerebro-spinal fluid caused by the motions of a vessel at sea, as has already been described by other writers. Of course, the concussive impact from tossing upon the waves is usually very gentle, but its long continuance finally overcomes the resisting power of the subject. The effect may be to make one tired or sleepy only, but too often nausea and dreadful depression are experienced. As in auditory concussion, such symptoms as a sense of constriction or of pain and great tension in the head characterize the more severe cases arising at sea. It is seldom that the landsman experiences the uninterrupted jarring of the brain which must be endured at sea; but the writer has seen many cases where the despondency from the concussion of sound even, as well as the other causes before mentioned, was almost as great as could be endured.

Where so many conditions favor the occurrence of sea-sickness, it is scarcely to be hoped that any specific cure will ever be found. In the writer's own experience, the nitrite of amyl, properly employed, has often been found to relieve some of the more disagreeable symptoms, through its influence on the vaso-motor system.

SAMUEL SEXTON.

New York, June 8.

Two balloon-voyages.

The two hundred and fiftieth anniversary of the founding of the city of Providence, R.I., afforded an opportunity for making meteorological observations in the free air. Mr. Hazen of the signal office, Washington, D.C., volunteered his services, and was ac-

cepted. On June 24, with a light east-north-east breeze and a gentle rain, the balloon City of Boston left Providence at 5.35 in the afternoon. There were four persons on board, which made it a little crowded; but by leaning out of the basket it was found possible to make the observations, which consisted chiefly in readings of an aneroid barometer, a sling psychrometer, and a watch. The balloon passed over Fishville, Hope, Coventry Centre, and West Greenwich, R.I., and landed in the tree-tops of Voluntown, Conn., at a little after 7.30. The temperature, on leaving the earth, was $60^{\circ}.2$, and at no part of the voyage did it reach a point below $56^{\circ}.7$. The highest point reached was 850 feet, at 6.43. An interesting observation on this voyage was the continual rising and falling of the balloon without the expenditure of ballast. This was partly due to the following: 1. A momentum acquired by the balloon was checked when the drag-rope (about seven hundred feet long) left the earth. Then the balloon began to descend till sufficient weight of the rope on the ground gave it enough buoyancy to rise: this, in turn, was counterbalanced as before. 2. A rise in the balloon was accompanied by a slight fall in temperature: this affected the gas, and gave it less buoyancy. On the other hand, a fall brought the balloon into warmer air, which had a tendency to reverse the former effect.

On June 25 the veteran aeronaut, James Allen of Providence, R.I., and Mr. Hazen, made a voyage, starting from the landing-place of the night previous. The air was perfectly still, and while there was no rain falling, yet the appearance of a heavy fog or mist hung rather low on the hillsides. It was impossible to discern any motion in this mist or in clouds above it.

The start was made at 7.44 in the morning, the air temperature being $61^{\circ}.3$. It was decided to make as high an ascent as possible. The earth was lost sight of at about 1,160 feet. The lowest temperature in the cloud was $58^{\circ}.3$, at 1,670 feet; and from this point it rose rapidly to $65^{\circ}.6$, at 2,450 feet. The highest point reached was 9,780 feet, at 9.18, with a temperature of 48° . Having been out of sight of land more than an hour, and the proximity to sea being rather close, it was deemed prudent at this point to make a descent, which was done with great rapidity; the basket striking the earth with some force, having fallen the 9,700 feet in thirteen minutes, or at the rate of twelve feet per second. The balloon landed within about two and one-half miles of the point from which the ascent of the previous day was made. The temperature at landing was $64^{\circ}.2$, with a gentle north-east wind. At a height of about 8,400 feet the shadow of the balloon was seen upon the clouds, with two rainbow-colored rings about it. Besides the interesting observations of temperature, indicating a rise of over eight degrees in an ascent of eight hundred feet, and showing that just at the top of the cloud the temperature was abnormally high, there were also observations on the direction of the balloon above the clouds. It has been usually considered that above the clouds it is impossible to tell any directions. It was found, on throwing over dried leaves, that they took a definite direction as shown by the compass, and afterward it was found that the balloon was moving in the direction which was indicated by the observer, or slower than the leaves. At the time this observation was made, the balloon was slowly rising, and it

would seem always possible to ascertain the direction under these circumstances. The clouds presented a magnificent spectacle, and seemed like gigantic billows upon a boundless ocean. The sun was very hot indeed, and every effort was made to observe a rising motion in the cloud, but entirely without success. Observations of humidity were made with a sling wet bulb, and the air temperature by a thermometer with a bulb about two millimetres in diameter. All the experiences indicated, that, with modern appliances of drag-rope and anchor, ballooning is entirely safe, and is especially adapted for researches in the free air, which are so very important at the present stage of the science of meteorology.

H. A. HAZEN.

Washington, Aug. 13, 1886.

The freezing-point of sea-water.

I submit the following as the result of several very careful determinations of the freezing-point of sea-water, made at North Bluff, Hudson Strait (latitude $62^{\circ} 33' 45''$ north, longitude $70^{\circ} 41' 15''$ west).

The situation of the place of observation was within an inlet, at about a mile from its mouth, into which the waters of the strait had unlimited access. A stream twenty feet wide discharged into the inlet at its head, two miles away.

The determinations were made on March 4, 1885, when the temperature of the air was $-12^{\circ}.6$ F., in the following manner:—

A hole about four feet square having been cut through the ice (2.85 feet thick), the water within it was thoroughly agitated by stirring from below, and during the actual operation slightly agitated. The thermometer was held nearly horizontally, the bulb slightly lower than the rest of the instrument, just below the surface of the water. When the ice film began to form at the surface of the water, the corrected reading of the thermometer (Negretti and Zambra, No. C. 3456) was $26^{\circ}.7$ F., at which point it remained stationary; so that, under the conditions I have mentioned, the freezing-point of sea-water is $26^{\circ}.7$ F.,—a point very much lower than that usually accepted as its freezing-point, and differing from it in a direction contrary to what we should have expected from the generally accepted assumption that northern waters are of less specific gravity than more equatorially situated waters.

It would have added to the value of the result had

I obtained the specific gravity of the water at the time. Later, when I thought to have done so, unavoidable circumstances prevented my doing so.

I might add that a similar determination was made on the opposite shore of the strait with a very closely agreeing result.

W. A. ASHE.

The Quebec observatory, June 7.

The scientific swindler again.

The following from one of the local papers here will show that the peculiar person who has repeatedly been shown up in *Science* is still at large and at work; at least, I presume he is the same person, since it is unlikely that there is more than one such perverse genius abroad. This time he turns up as a deaf-mute, attached to the Smithsonian, and named 'R. M. Vasile.'

"The Syracuse (N. Y.) *Herald* says, 'A highly educated man, who appeared to be deaf and dumb, and who represented himself to be an attaché of the Smithsonian institution at Washington, came here eight or ten days ago, and succeeded in ingratiating himself into the confidence of Prof. W. A. Brownell of the high school, and of other scientific gentlemen. He gave his name as R. M. Vasile. It took him but a short time to prove himself a master of geology, mineralogy, and chemistry, and his proficiency in those sciences lent color to his representation that he had come here to investigate the rocks and minerals of Onondaga county, and also to get together material for a report on its fishes. Professor Brownell obtained from him for a mere trifle a rare and valuable scientific work, and for one dollar and twenty-five cents got a promise from him, that, upon his return to Washington, he would send on a set of trilobites. Having thus won the confidence of the professor, he began to talk of exchanging specimens with his new-made friend; but his offers excited suspicion, and an inquiry sent by telegraph to Washington brought back the information that Vasile was not in the government's employ. Soon afterward the man disappeared, and he has not been heard from since. He left a board-bill at the Kingsley House, and the impression prevails there that he only pretended to be deaf and dumb. His scheme is apparently to borrow books and scientific specimens in one town, and dispose of them in another.'"

ELLIOTT COUES.

Smithsonian inst., June 8.

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